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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/084,925	03/01/2002	Takashi Nikami	020277	7137

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EXAMINER

VU, QUANG D

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 09/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/084,925

Applicant(s)

NIKAMI, TAKASHI

Examiner

Quang D Vu

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-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on amendment filed on 06/12/03.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3,4,6 and 7 is/are rejected.
- 7) ☒ Claim(s) 2,4,8 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification (figures 1-3) never discloses the gate electrode includes a first gate portion provided above the channel region and a second gate portion provided above a region which is not the channel region, the source region or the drain region, and the second gate portion includes the P-N junction as claimed in claim 1.

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-4 and 6-9 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, in lines 11-12, the phrase “a second gate portion provided above a region which is not the channel region, the source region or the drain region, and the second gate portion includes the P-N junction” fails to clarify what is the region above which the second gate portion is provided.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1 and 7 are rejected under 35 U.S.C. 102(e) as being anticipated by Applicant Admitted Prior Art (AAPA).

AAPA (figure 4) teaches a semiconductor device, comprising:

a source region formed of a semiconductor;

a drain region formed of a semiconductor of the same conductive type as that of the source region;

a channel region (202) formed of a semiconductor between the source region and the drain region;

a gate insulating film (201) provided on the channel region (202); and

a gate electrode (104) provided on the gate insulating film (202) and formed with a P-N junction including a P-type semiconductor region (104b) and an N-type semiconductor region (104a),

wherein the P-type semiconductor region (104b) and the N-type semiconductor region (104a) of the P-N junction of the gate electrode are electrically insulated,

wherein the gate electrode includes a first gate portion (103) provided above the channel region (202) and a second gate portion (104) provided above a region which is not the channel region, the source region or the drain region, and the second gate portion (104) includes the P-N junction.

Regarding claim 7, AAPA teaches the silicide (401) is formed on surfaces of the source region and the drain region.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2-3 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of US Patent No. 5,466,958 to Kakumu.

The disclosure of AAPA is discussed as applied to claims 1 and 7 above.

AAPA differs from the claimed invention by not showing silicide is not formed on the P-N junction of the gate electrode. However, Kakumu (figure 7) teaches silicide is not formed on the P-N junction of the gate electrode. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Kakumu into the device taught by AAPA because it isolates the electrical connection in the P-N

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junction. The combined device show the silicide is not formed on the P-N junction of the gate electrode.

Regarding claim 3, the disclosures of AAPA are discussed as applied to claims 1-2.

AAPA differs from the claimed invention by not showing the P-N junction of the gate electrode is covered with an insulating material. However, Kakumu (figure 7) teaches the P-N junction of the gate electrode (712, 703) is covered with an insulating material (710). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Kakumu into the device taught by AAPA because it protects the gate electrode from the external damage. The combined device show the P-N junction of the gate electrode is covered with an insulating material.

9. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of US Patent No. 5,144,390 to Matloubian.

The disclosures of AAPA are discussed as applied to claims 1 and 7 above.

AAPA teaches a body region (105) formed of a semiconductor under the channel region. AAPA differs from the claimed invention by not showing a buried insulating film provided under the body region, the source region, and the drain region; and a semiconductor substrate region provided under the buried insulating film. However, Matloubian (figure 2) teaches a buried insulating film (4) provided under the body region (12), the source region (6), and the drain region (8); and a semiconductor substrate region (2) provided under the buried insulating film (4).

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Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the SOI structure of Matloubian into the device taught by AAPA because it supports the substrate of the device. Additionally, the SOI technology is well suited for high performance and high-density integrated circuits. The combined device shows a buried insulating film provided under the body region, the source region, and the drain region; and a semiconductor substrate region provided under the buried insulating film.

10. Claims 8-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA in view of Matloubian as applied to claims 1-3, 6 and 7 above, and further in view of US Patent H1435 to Cherne et al.

The disclosures of AAPA and Matloubian are discussed as applied to claims 1, 6 and 7 above.

AAPA and Matloubian differ from the claimed invention by not showing a body contact region formed within the body region and having a higher impurity concentration than the body region. However, Cherne et al. (figure 13) teach a body contact region formed within the body region and having a higher impurity concentration than the body region. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Cherne et al. into the device taught by AAPA and Cherne et al. because it insures the parasitic sidewall threshold is higher than any positive negative threshold shift which might be induced by ionizing radiation. The combined device shows a body contact region formed within the body region and having a higher impurity concentration than the body region.

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Regarding claim 9, the combined device shows the body contact region is formed in a region outside the second gate portion.

Allowable Subject Matter

11. Claim 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

12. The following is a statement of reasons for the indication of allowable subject matter: The prior art, including most closely related art, AAPA, US Statutory Invention Registration H1435 to Cherne et al. and US Patent No. 6,555,446 to Unnikrishnan, does not anticipate or render obvious the semiconductor device as defined in the above objected claims, comprising particularly: a source and drain region formed of a semiconductor of the same conductive type; a channel region formed of a semiconductor between the source region and the drain region; a gate insulating film provided on the channel region; and a gate electrode provided on the gate insulating film and formed with a P-N junction including a P-type semiconductor region and an N-type semiconductor region, wherein the P-type semiconductor region and the N-type semiconductor region of the P-N junction of the gate electrode are electrically insulated from claim 1, and further comprising:

Regarding claim 4, the silicide is formed on a part of the gate electrode which is not covered with the insulating material.

Response to Arguments

Applicant's arguments with respect to claims 1-3, 6-7 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 703-305-3826. The examiner can normally be reached on Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the

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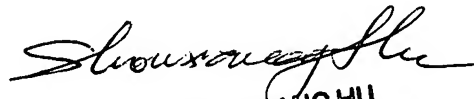
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organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

qv
August 18, 2003


SHOUXIANG HU
PRIMARY EXAMINER